into some terrible traps. For instance, we are informed on p. 238 that he concluded to retain for the bank-vole the name *Evotomys glareolus* in place of *E. hercynicus britannicus*. Well and good! But why do we find the Skomer vole, which is regarded as a subspecies of the former, designated *E. hercynicus skomerensis?* This, however, is not all, for the latter, which was named by Captain Barrett-Hamilton in 1903, figures as "*sub-spec. nov.*"! apparently on the notion that if an animal is relegated from specific to subspecific rank it is to appear as a new form! The truth, we are afraid, is that the author does not understand even the rudiments of nomenclatural rules.

Another blunder occurs in the case of the so-called water-vole. On p. 231 we are told that the British voles are divisible into the two genera Evotomys and Microtus, the latter being represented by three species. When, however, we come to p. 287 we find the water-vole described as *Arvicola amphibius,* the author apparently not understanding that, as the representative of a subgenus, it should have been called *Microtus* (*Arvicola*) *amphibius,* if he declines to accept the alternative specific title *terrestris* used by advanced writers. In consequence of this blunder the uninitiated reader may enter a kind of puzzle-competition to discover the third species of Microtus referred to on p. 231.

Here we may make a short digression to express the wish that the author had given his opinion on the use of the term "Vole." The proper English name of *Microtus amphibius* is undoubtedly "water-rat," just as "hedge-sparrow" is the indefeasible title of the bird ornithologists are pleased to miscall "hedge-accentor." In order to distinguish the water-rat and the short-tailed field-mice from the true rats and mice they have, however, for many years been termed "voles" by naturalists. Now Macgillivray tells us ("Brit. Mammals," Naturalists' Library, p. 260) that the name "vole" is a meaningless term introduced by Dr. Fleming to replace the French campagnol, then in use among naturalists. If this be true, the word ought to be expunged from nomenclature altogether as a "bogus" term; and from no point of view is its use justifiable for the British water-rat and short-tailed field-mice, which have vernacular names of their own. It may be added that the word vole does not appear to be derived from the German *Wühlmaus* (burrowing mouse), *Veltmaus* (field-mouse), or *Waldmaus* (wood-mouse).

To revert to our criticisms on nomenclature, we may conclude by mentioning that we are at a loss to understand why, from the point of view of the advanced side of the subject, the author calls the brown rat *Mus decumanus* in place of *M. norvegicus*; and that in the case of the black rat his English names for the local races are open to strong objection, as, for instance, northern Alexandrine rat in place of the northern or typical black for the type form.

Another point of some importance strikes us on looking through the volume. Among the list of photographic illustrations (which are in addition to the plates already referred to) we note some very interesting plates of the skulls and dentition of the weasel group, rats, dormice, "voles," &c., reproduced from drawings by Mr. H. Grönvold. Curiously enough, there appears no reference in the text to these beautiful figures, nor is there any index pointing out the details of the enlarged figures of teeth.

This is a great pity, as the figures of molar teeth are of much interest, and exhibit details not shown in any other work with which we are acquainted. How the author could have given so much time to the selection and arrangement of such beautiful figures (and from the absence of any reference to the name of any friend who may have assisted the reader is left in the belief that this selection is the work of the author) without describing the structures thus portrayed it is difficult to understand. It may be pointed out that it would have been better had all the teeth selected for illustration been in the same state of wear; and we note some little errors, due to the lack of skilled supervision, in the figures of the molars of the voles; while in the plate forming the frontispiece the skull of the badger is not, as it purports to be, represented anything like the natural size.

While there is much to admire in this volume, the foregoing criticisms (which by no means exhaust all that might be said) show that it is a long way short of perfection. The truth, we venture to think, is that the author, although an enthusiastic and excellent field-naturalist, lacks the scientific training necessary for success in a work of this nature, and, as we have had occasion to remark when reviewing the works of other amateur naturalists, it would have been better had the assistance of one of his professional brethren been secured for the revision of the nomenclature and other technical aspects of the subject. Such a magnificent undertaking ought not to be marred by any feeling on the part of its author that it is beneath his dignity to claim such assistance in regard to details and technicalities with which the amateur field-naturalist can scarcely be expected to be acquainted.

R. L.

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## *THE ORIGIN OF KINGSHIP.*

*Lectures on the Early History of the Kingship.* By Dr. J. G. Frazer. Pp. viii+309. (London: Macmillan and Co., Ltd., 1905.) Price 8*s.* 6*d.* net.

WE learn from the preface to this work that it consists substantially of a series of extracts from the forthcoming third edition of the "Golden Bough." Few, however, will feel called upon to quarrel with the author for this somewhat unusual procedure, for the "Golden Bough" is, to use a mixed metaphor, a work of many diverse threads, and the lay reader will be grateful for the chance here given him of following up one line of argument, itself far from simple, without the necessity of disentangling it from a mass of material and hypothesis linked together by the general theory there set forth.

Dr. Frazer warns his readers at the outset that they must not expect him to deal exclusively with royal personages; in order to make the sacred and magical functions of kings intelligible, a sketch of those superstitions is needed of which the beliefs connected with kingship are a specialised form. Accordingly, after a brief survey of the facts which have already served as a text to the "Golden Bough," with, however, an important modification as regards Virbius, the first priest of the Grove of Nemi, we plunge into the question of magic, its classification and explanation. Here we are met with an important modification in terminology; sympathetic magic is divided into two classes:—(1) homœopathic, otherwise termed mimetic; (2) contagious, previously called sympathetic. After exemplifying these forms of magic by illustrations covering some fifty pages, Dr. Frazer grapples with his real subject, and shows how the magician in many savage tribes develops into the chief or king. Then, returning to the Grove of Nemi, he takes up the new point as to Virbius—that he was the husband of Diana, the goddess of the grove, and illustrates at length the custom of marrying gods, especially tree and water gods, to human beings. This is followed by a discussion of these customs in Rome in particular, in the course of which are made the suggestions that the union of Numa and Egeria was of this type, that Roman kings were regarded as the sons of the fire god by the vestal virgins, and that the succession in the kingship among the Latins was through the female line. Dr. Frazer then proceeds to deal with various features of the Roman customs relating to the king, such as the Saturnalia, the *Regifugium,* and the violent death suffered by so many of the royal line, and finally concludes that the king of the wood, Virbius, represented Jupiter; with Jupiter, on grounds which seem convincing, he equates Janus or Dianus; holding that Jupiter, and consequently also his double, Janus, was an oak god, Dr. Frazer finds it extremely natural that Virbius should mate with an oak goddess; regarding the union of Numa and Egeria as a variant of the marriage of the priest of Nemi, he shows good grounds for holding that Egeria was an oak nymph and identical with Diana, whose name is a variant form of Jana; and, finally, he briefly expounds his explanation of why the priest of the grove had to do battle for his title, quoting an Indian parallel observed, though in very different form, in the kingdom of Calicut down to 1743.

Broadly speaking, the book falls into three parts, distinguished by the subject-matter and, to some extent, by their relative completeness. The first part, introductory and illustrative of savage beliefs in general, is naturally no more than a selection; the third part, dealing with the classical evidence, seems very exhaustive, far more so than the first two editions of the "Golden Bough," a result due in part to the contributions of Mr. A. B. Cook, whose services Dr. Frazer acknowledges; the second part, on the other hand, should, on strictly inductive principles, contain a survey of the whole field of savage chieftainship, if possible on a statistical basis; and this is the more necessary as, to judge by the title, this part should contain the kernel of the book. Dr. Frazer disarms criticism by affirming that his thesis of the magical origin of kingship is of general application only; in fact, he expressly abstains from claiming more than that it is broadly true that we owe to the magician the rise of despotism, in which, paradoxically but truly, he sees the germ of human liberty. His examples of savage magicians are taken almost exclusively from Australia, Melanesia, and Africa. But as regards Australia, it seems far from being generally true that the head of a totem kin is also head of the local group; and if this is so Dr. Frazer's argument that the head of a totem kin is a magician *par excellence* does not advance his general argument that the head of a local group, or of the whole tribe, tends to be a magician; then, again, we find in many cases that the head of the tribe is a specially gifted orator or hunter, but of his magical qualifications we hear nothing or next to nothing; finally, in a society where all old men are magicians, it is a natural thing for the chief to be a magician also; but this is not equivalent to saying that he owes his position as chief to his magical powers. The general impression gathered from Dr. Howitt's work, on which Dr. Frazer relies for Australia, is, in fact, that magical powers are only one among several causes which help a man to the chieftainship. The Melanesian facts, it may be granted, tell in Dr. Frazer's favour; but Melanesia is a comparatively small area. For Africa, as for Australia, we should have been better able to judge of the magician theory if we had before us something like a conspectus of the material or even a statement of the proportion of cases in which this theory holds good.

Africa, Melanesia, and Australia are the areas from which Dr. Frazer takes his examples of magician-chiefs. Where his object is simply, as in the "Golden Bough," to justify a theory by a collection of examples, it would be unreasonable to complain that the author fails to exhaust his material. But in the work before us it is different. Europe and parts of Asia are, no doubt, too advanced for any certain conclusions to be based on the facts; but in elaborating his argument as to the origin of chieftainship Dr. Frazer has almost entirely neglected the New World. After the opening eulogy of the inductive method, it is not a little remarkable that Dr. Frazer should be content to rest his case on so partial a statement of facts, whether the American facts tell for him, or, as is more probable, against him. In any case mention should have been made of the war-chief as one of the forerunners of royalty; the war-chief is found, not in America alone, but also in Australia and Africa.

It is naturally impossible to deal with all the points which invite criticism; it must suffice to mention a few in passing. Although Dr. Frazer deals largely with magic, and re-asserts its priority over religion, we nowhere find a definition of either; we are left in the dark as to whether, in Dr. Frazer's view, the two classes of magic mentioned above cover the whole field or whether other kinds of magic exist. In the explanation of the origin of magic more stress is laid on the association of ideas as a starting point, not merely an *ex post facto* explanation, than modern psychologists would be prepared to grant to it. The savage examples of inheritance through females are far from being parallel to the rule of succession by marriage, assumed to be the Latin rule.

Of Dr. Frazer's charm of style and literary skill in arranging his material it is needless to speak, and the points noted above detract in no way from the interest of the book, which, indeed, might rest its reputation on the classical material alone. An adequate index is provided. N. W. T.

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## *A COMPENDIUM OF NATURAL KNOWLEDGE.*

*Landolt-Börnstein—Physikalisch-chemische Tabellen.* Dritte Umgearbeitete und vermehrte Auflage. By Drs. Börnstein and Meyerhoffer. Pp. xvi+861. (Berlin: Julius Springer, 1905.) Price 36 marks.

THE promised new edition of Profs. Landolt and Börnstein's well-known tables of constants, a work which has long been familiar in the laboratories of physicists and chemists throughout the world, has at length appeared after being in the press nearly three years.

As regards the number of pages, the book contains about half as many again as the second edition published in 1894, and three times as many as the first edition of 1883.

A book such as the present volume may be compiled on several different plans. An attempt may be made to give a complete list of all determinations of any physical constant, with references in each case. This method, however, would entail enormous labour and make the resulting volume very ponderous without conferring any additional advantage on the user, except, perhaps, the specialist interested in the history rather than the present accepted value of any physical constant. A second plan would be to collect from the whole literature only the more recent references, and a third to give, as is usual in the various pocket-books, a single value for each constant. In the compilation of the present work no one of these systems has been followed throughout, although the rule of giving a reference to the source of information has been rigidly followed in each case. The result is undoubtedly the most complete work of reference of its kind in any language, if we except the treatise on physical constants now being brought out by the French Physical Society, which will require many volumes for its completion. The original compilers have called to their aid about forty specialists, and in all cases the name of the person responsible appears at the foot of each table.

To criticise a work of this kind is no easy task; indeed, to do it at all adequately the editor would be obliged to call in the services of a number of reviewers rather than a single individual. In the writer's opinion, however, the object of a reviewer should be rather to attempt to appreciate the book in question at its true value, and to indicate whether in his opinion it is likely to serve the purpose for which it is intended, rather than to put together a long list of grammatical slips and printer's errors, though this side of the question need not go wholly without attention.

A cursory comparison of the book with the earlier editions of 1883 and 1894 will convince everyone of the substantial advance that has been made both in our knowledge and in the completeness of the work in question. Indeed, this very completeness in certain directions appears at times almost appalling. For every person who wishes to look up the index of refraction for the green thallium line of "Camphocarbonsaürekohlensaürediethylester," which is given, there would probably be a hundred who would be glad to be informed as to the electrical properties of Acheson graphite, which is not mentioned, and a thousand who would like some more precise indication as to the melting point of common salt than simply a catalogue of values varying from 776° to 820° C.

Indeed, the character of the information excluded from the book at once proclaims the preeminently academic rather than practical tastes of the majority of its compilers. For example, no word is to be found as to the electrochemical equivalents of the metals, or as to the flash and firing points of the various oils used in industry. A mixture such as petrol has properties as definite as many single substances, and is vastly more important than many out-of-the-way bodies the properties of which are here detailed. The work is a monument to the industry and book-learning of the German professor, but if it had to be translated into English many changes might be introduced with advantage. One can picture the trained electro-chemist of an up-to-date American works expressing his disappointment when he finds that, though he could revel in pages of "Ueberführungszahlen," yet important bodies like carborundum and siloxicon are not even mentioned, and he would appeal in vain to the book if he wished to ascertain whether magnesia or alumina had the lower melting point.

The following may serve as an example of the somewhat irritating way in which some of the data are expressed. We conventionally divide all substances into electrical insulators and conductors, and again we divide the metals and alloys into those used for *current-carrying* and those employed as *resistances*. It may be *academically* correct to lump all these together and tabulate their conductivity as a number multiplied by a factor varying from $10^4$ to $10^{-18}$, but there is no question as to the superior *utility* of giving the resistivity of the usual insulators in megohms or millions of megohms per centimetre cube and that of the other materials both in microhms and in terms of copper.

We are glad to notice that in the matter of units many improvements have been made on the old edition. The three confusing brands of calories met with in thermochemistry have been unified, and in the section on thermal conductivity the C.G.S. system has displaced the inconvenient units formerly employed.

The information given in the book is on the whole accurately compiled,[1] yet we regret to find that misprints, which have been corrected by their authors,

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[1] A list of a few errors discovered has been sent to the authors.